

Claims

- [c1] 1.A method for operating a power system, comprising:
receiving a plurality of sensor signals at a common data bus, each sensor signal representative of an operating characteristic of a power system module;
receiving and analyzing at a controller the sensor signals from the common data bus for the presence of an abnormal operating condition, and in response thereto determining whether an operational adjustment of the power system module is desirable; and
in response to the existence of a desirable adjustment condition, automatically adjusting operation of the power system module;
wherein a first sensor of the plurality of sensors is arranged for providing an operating characteristic that is derivable from one or more of the other sensors, the one or more other sensors including a different type of sensor than the first sensor, thereby providing redundant system information for determining whether an operational adjustment of the power system module is desirable.
- [c2] 2.The method of Claim 1, further comprising:

providing to the common data bus an additional sensor signal representative of an operating characteristic of the power system, which results from an operating characteristic at one or more of the power system module.

[c3] 3.The method of Claim 1, wherein the common data bus includes a simplex channel, a redundant channel, or any combination thereof, arranged for parallel signal communication.

[c4] 4.The method of Claim 1, wherein the analyzing further comprises:
determining whether a sensor reports an abnormal operating condition;
in response to a sensed abnormal operating condition, determining whether the sensor is unhealthy;
in response to the presence of an unhealthy sensor, determining whether the operating characteristic sensed by the unhealthy sensor is derivable from one or more other sensors in the power system;
in response to the operating characteristic sensed by the unhealthy sensor not being derivable, determining whether an operational adjustment of the power system module is desirable; and
in response to a desirable adjustment condition, automatically adjusting operation of the power system module.

- [c5] 5.The method of Claim 4, further comprising:
in response to the operating characteristic sensed by the
unhealthy sensor being derivable but the derived charac-
teristic being indicative of an abnormal operating condi-
tion, determining whether an operational adjustment of
the power system module is desirable.
- [c6] 6.The method of Claim 5, wherein automatically adjust-
ing the power system module comprises:
changing an operating state of a valve, a pump, a switch,
or an output device.
- [c7] 7.The method of Claim 6, wherein said changing the op-
erating state comprises:
shutting down the power system module.
- [c8] 8.The method of Claim 6, wherein said changing the op-
erating state comprises:
running the power system at reduced performance to ac-
commodate the desirable adjustment condition.
- [c9] 9.The method of Claim 1, further comprising:
monitoring the sensor signals at the common data bus;
and
in response to an abnormal operating condition, auto-
matically adjusting an operating state of a control device
in a direction to compensate for the abnormal operating

condition.

- [c10] 10.The method of Claim 1, further comprising:
storing data relating to an operating characteristic of the power system module; and
reporting the stored data to an external system or user on demand.
- [c11] 11.The method of Claim 10, further comprising:
processing at least a portion of the stored data to synthesize a replacement signal or to command a degraded operational mode.
- [c12] 12.A control system for a power system, comprising:
a controller having a processor for executing instructions for:
monitoring sensor signals at a common data bus, the common data bus in signal communication with a plurality of sensors, each sensor signal representative of an operating characteristic of the power system;
receiving and analyzing the sensor signals to determine the existence of a malfunctioning device, the malfunctioning device including a sensor, a processing element, an output device, or a control device; and
automatically reconfiguring other operational devices controlled by the control system to accommodate for the malfunctioning device.

- [c13] 13.The system of Claim 12, wherein the processor further executes instructions for communicating over multiple channels.
- [c14] 14.The system of Claim 13, wherein the processor further executes instructions for:
receiving and analyzing the sensor signals to determine the existence of an unhealthy sensor signal; and
substituting a redundant sensor signal or a derived sensor signal for the unhealthy sensor signal.
- [c15] 15.The system of Claim 14, wherein the automatically reconfiguring comprises:
adjusting an operating state of a control device, substituting a redundant sensor signal or a derived sensor signal for the unhealthy sensor signal, shutting down a power system module, or running the power system in a degraded mode.
- [c16] 16.The system of Claim 12, wherein the processor further executes instructions for:
analyzing the sensor signals for the presence of an abnormal operating condition and
in response thereto, adjusting an operating state of a control device in a direction to compensate for the abnormal operating condition.

[c17] 17.The system of Claim 12, wherein the processor further executes instructions for:
storing data relating to an operating characteristic of the power system; and
reporting the stored data to an external system or user on demand.

[c18] 18.A control system for a power system, comprising:
a processor for executing instructions for:
determining whether a sensor reports an abnormal operating condition;
in response to a reported abnormal operating condition, determining whether the sensor is unhealthy;
in response to the presence of an unhealthy sensor, determining whether the operating characteristic sensed by the unhealthy sensor is derivable from one or more other sensors in the power system, the one or more other sensors including a different type of sensor than the unhealthy sensor;
in response to the operating characteristic sensed by the unhealthy sensor not being derivable, determining whether an operational adjustment of the power system or a portion thereof is desirable; and
in response to the existence of a desirable adjustment condition, automatically adjusting the operating condition of the power system or a portion thereof.

- [c19] 19. The system of Claim 18, further wherein the processor is for executing instructions for:
in response to the operating characteristic sensed by the unhealthy sensor being derivable but the derived operating characteristic being indicative of an abnormal operating condition, determining whether an operational adjustment of the power system or a portion thereof is desirable.
- [c20] 20. The system of Claim 19, wherein automatically adjusting the operating condition comprises:
adjusting an operating state of a control device in a direction to compensate for the abnormal operating condition.
- [c21] 21. The system of Claim 19, further comprising:
a communication architecture for communicating sensor signals between elements of the power system, the communication architecture including a common data bus having a simplex channel, a redundant channel, or any combination thereof, arranged for parallel signal communication.